LIVING VERSUS DEAD BIOLOGY

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Dead biology teaches the unity of all life, and the cell as the ultimate source of living matter; living biology teaches the interdependence of all things living and their interactions each on the other. Biology, whether dead or alive, must be taught in such a way that it develops the power of observation, of logical thought, of constructive interpretation. To show the unity of all life, the dead biology requires an intensive study of the internal structure of plants and animals. To show the interdependence of all things living and their interactions each on the other, the living biology requires an extensive study of the life-habits of plants and animals. It might be interesting to question the relative merits of the two biologies as mental stimulants and developers. But when we reflect that mental and moral discipline is largely habit and that habit functions and persists only by use, we must agree that the applicability of a subject to the general life of the child is a safer criterion of merit than is its applicability to the mere school life of the child. From this point of view, it is clear that the method of study which relates its work to the universal life of the pupil produces greater mental development than the method which relates its work to an isolated phase of the pupil's life; namely, the classroom phase. From which biology, then, the living or the dead, can be secured to the pupils, along with mental power in biological concepts, the greatest number of useful, usable life-habits?

As has been said, the predominant thought in the dead biology is the unity of all life. The concept of the unity of the diverse forms of matter is an extremely difficult one, and is capable of comprehension by mature intellects only. In order that the child's mind may be developed and made ready for this ultimate concept, rigorous work in minute dissection and in elaborate microscopic interpretation is required of him. The predominant thought of

unity can be developed only through the study of structure and of structural development from simple to complex forms. Whether such work relates itself to the universal life of the child is immaterial to the dead biology, the sole purpose of which is to increase the pupil's mentality to the point where the unity of diverse forms of life is comprehensible. The fact that such a concept in no way directly affects the personal, domestic, and civic life of the pupil is disregarded by the school of the dead biology.

The predominant thought of the living biology is the interrelation of all things living. This absorbing idea is developed through the study of the dependence of plants upon inorganic matter, the dependence of animals upon plants, and the dependence of man upon all three, inorganic matter, plants, and animals. In living biology structure as structure plays but a small part, while life-history and economic importance are the large elements. How does the animal or plant secure food and shelter, and how does it cope with its world? In such study, the pupil is brought in touch with creatures whose problems are similar to his own. Here the laboratory—the workshop of the dead biology—is deserted for the world itself, which thus becomes the laboratory of the living biology. The dead bee and ant are nothing to the pupil, but from the living, active ant or bee colony, he learns community life, the strength of the many as contrasted with the weakness of the few. From other simple studies of plants and animals he learns the close influence which plants and animals exert on man's supply of food and raiment; cotton from the cotton plant, silk from the cocoon, the relation of the wheat midge to the size of a loaf of bread, and of the cotton weevil to the cost of cotton. He learns that a better understanding by man of plant and animal life and their relation to soil, climate, etc., is absolutely necessary if man's needs are to be met in the future; for example, the relation of the ladybug to the fruit-tree scale, of the ichneumon fly to insect pests, of the cactus plant to the desert, of certain crops to dry farming, etc. He learns that not only his comfort but his very existence itself is jeopardized by animal and plant life, by the fly carrying typhoid fever, by the mosquito carrying malaria, by the rats carrying the bubonic plague, and by various disease-producing bacteria.

The old biology which limits its observation mainly to the microscope or at best extends it to the four walls of the laboratory does not relate itself to the present life of the child. The new biology does relate itself to the present life of the child because it extends its observation and investigation to the filtration plants which supply him with water, to the dairies which furnish him with milk, to the fly-infested shops which supply his meat, to municipal hospitals, to quarantine stations, to day nurseries, to uncovered garbage cans, to markets and shops with loathsome vermin, to gutters and drains with dangerous breeding-places, to the city trees devastated by pests, to the reclamation of waste lands by irrigation and drainage, and to a host of other practical subjects.

Increased mentality results—yes, and along with it, as life-habits, increased interest and responsibility in affairs personal, in affairs domestic, in affairs civic, and in affairs national.

Another by-product of the living biology is the opportunity it offers for the development of the aesthetic sense. The average person is far from being an artist, as is evident from the ubiquitous demand for the colored supplement of the Sunday newspaper. The aesthetic sense latent in the child is stimulated if he is taught to beautify the school and home by growing plants. Microscopic study of plant and animal life does not influence the aesthetic taste; on the other hand, the macroscopic study of flowers, leaves, birds, butterflies, etc., strongly develops aesthetic perception and appreciation. In our own school this is very evident. In the drawing department the designs used by the pupils have their origin in the living plant and animal life available in the laboratories rather than in conventional geometric forms; and the pupils of the living biology show far more artistic perception and appreciation than those taught under the dead biology system. To see the beautiful and to reject the false is a life-habit which is essential to high moral living, and any method of study which intrinsically fosters such habits cannot be too strongly commended.

Deliverance from superstition is an important by-product of the living biology. In olden times the horror of frogs was so great that the harmless animal was the symbol of all that was vile and loathsome, and for centuries served to represent despicable deeds and thoughts. Because of this unfounded superstition

thousands of frogs were killed, and in consequence infinite hordes of destructive insects were left to breed in ponds. The graceful dragon fly is feared by ninety children out of a hundred because of the legend which relates that it sews up the lips. The study of living animals frees the mind of the pupil from fear and repulsion of harmless creatures; and every time a human being is freed from superstition, however insignificant, he is brought into clearer vision. Not only is superstition removed from the mind, but in its place is substituted reverence for the creatures whose lives are helpfully interwoven with his own.

One of the most conspicuous life-habits engendered by the living biology is that of securing diversion and recreation by natural rather than by artificial methods. The half-holiday walk in the open is not the same to the students of the living and of the dead biology. Pupils who could sketch accurately the conjugation of varied algae, and the cross-section of complex plants, often walk through the woods entirely oblivious to the marvelous natural beauty there. Pupils must be taught to see the printed page with an understanding eye; they must likewise be taught to see Nature with an understanding eye; and the school owes it to the child to give to him the key to the book of Nature as well as to the book of letters, to give to him an indirect means of pleasure as well as an indirect means of work. The living biology with its vision into natural diversions tends to emancipate present and future generations from the craze for artificial entertainment, and to make available to them for their leisure hours simple, healthful recreations.

The living biology, then, is a powerful factor for social uplift. It increases mentality in the abstract by its classroom work; it increases efficiency in the concrete by its unceasing application of scientific laws to the daily happenings of life. It raises the moral tone by its applied lessons on the interdependence of society, and by the responsibility which it thrusts upon its adherents of carrying out their lessons by right living. And, last, it not only gives to its students lessons in ethical standards, but it gives them ways and means whereby such ethical living is made possible, namely, simple recreations, responsive kinship with all creatures, hygienic practices, and a wide vision of man's relations to his fellow-man.